

DETAILED ACTION

This Office Action is in response to the communication filed on 10/29/09.

Applicant's arguments have been considered, but are not persuasive. Claims 1-3, 7, 8, 10-12, 30-33 and 35-42 are pending. This Action is FINAL.

Claims Analysis

As noted by Applicants, 35 USC 112, sixth paragraph has been invoked. A claim limitation will be interpreted to invoke 35 USC § 112, sixth paragraph, if it meets the following 3-prong analysis: (A) the claim limitations must use the phrase "means for" or "step for;" (B) the "means for" or "step for" must be modified by functional language; and (C) the phrase "means for" or "step for" must not be modified by sufficient structure, material or acts for achieving the specified function. See MPEP § 2181 .1.

In claim 1, the limitation "in response to the temperature" will not be given patentable weight. Any means for controlling an operating frequency of the microprocessor will read upon the means-plus-function limitation.

In claim 7, the limitation "in response to the temperature sensed by the temperature sensor" will not be given patentable weight. Any means for modifying a fluid flow will read upon the means-plus function limitation.

In claim 8, the limitation "in response to the temperature sensed by the temperature sensor" will not be given patentable weight. Any means for modifying a power output level of the fuel cell will read upon the means-plus function limitation.

In claim 30, the limitation "in response to the temperature" will not be given patentable weight. Any means for controlling a voltage provided to the integrated circuit will read upon the means-plus-function limitation.

Regarding claims 36-42, Applicant is not claiming a method of operating an electronic system. Therefore, the limitation "coupled to control voltage to the integrated circuit in response to the temperature" in claim 36 is not given patentable weight. Furthermore, the limitation "coupled to control an operating frequency of the microprocessor in response to the temperature" in claim 40 is not given patentable weight.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 7, 8, 10-12, 30-33 and 35-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parr et al., US 6,887,606 in view of Fukazu et al. (US 2002/0011327)

The claims are to an apparatus, which is a product. Language that suggests or makes optional, but does not limit the claims to a particular structure does not limit the scope of the claims or claim limitation. MPEP 2106c and 2111.04. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. When the prior art structure is capable of performing

Art Unit: 1795

the intended use, it meets the claim. These limitations are given weight with regard to structure, but not with regard to function.

Parr teaches a fuel cell system method and apparatus. A controller in the fuel cell system performs various operating parameter checks at a predefined schedule, including one or more of a stack temperature check, a stack current check, a stack voltage check and/or a cell voltage check. The frequency of the checks are set relative to achieve an efficient control of the fuel cell system by selectively distributing the load on the microcontroller (abstract). Figure 1 shows a fuel cell monitoring and control system 14 comprising a fuel cell stack 12, a microprocessor 40, cooling channels 31,32, sensors 44, actuators 46 and a circuit board 38. The cooling of the fuel cell is adjusted if the stack current does not exceed the stack current failure threshold (3:40-45). Figure 17 is a flow diagram of a method of monitoring a stack temperature of the fuel cell system and adjusting cooling of the fuel cell stack in response (4:1-5). The fuel cell stack includes flow field plates 28 including a plurality of cooling channels 32. The cooling channels 32 transmit cooling air through the fuel cell stack 12. The coolant may be liquid or gas (5:28-52). The microprocessor 40 is appropriately programmed or configured to carry out fuel cell system operation (6:60-68). The fuel cell system removes excess heat from the fuel cell stack and used the excess heat to warm fuel tanks by way of a cooling system. The cooling system includes a fuel cell temperature sensor that monitors the core temperature of the fuel cell stack. The temperature is provided as input to the microprocessor (8:46-51). A hydrogen sensor heater, a fuel cell stack and a reformer are heat generating devices.

Parr does not explicitly state the coolant remove heat from the microprocessor. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because removing heat from electronic components is well known in the art. Fukazu teaches a cooling device comprising a heat sink that is provided with a passage through which coolant flows and that removes heat from electronic devices (abstract). One of skill would have found it obvious to use the coolant of Parr to cool the microprocessor of Parr in view of the teaching by Fukazu that a coolant flow may be used to remove heat from electronic devices. Furthermore, since the fuel cell is cooled by the coolant flowing through the coolant channels and the microprocessor is attached to the fuel cell (Figure 1), the fuel cell may act as a heat sink for the microprocessor. Thereby, the coolant of Parr would cool the microprocessor via cooling of the fuel cell stack.

As shown in at least Figure 1, the coolant flows through the cooling channels in the anode 22 and cathode 24. Parr mainly discusses using air as a coolant that is moved by a fan. However, Parr discloses the coolant may be a liquid. One of skill would have known and would have found it obvious to use a pump to pump a liquid coolant through the cooling system of Parr. Note the type of coolant used is not given patentable weight because the type of coolant used does not structurally limit the claimed apparatus. Claims 31-33 and 37-39 do not appear to further limit the claimed electronic system. An antenna is considered inherent in the teaching of Parr.

Response to Arguments

Applicant's arguments filed 10/29/09 have been fully considered but are not persuasive.

Applicant argues the cited references fail to teach the subject matter of claim 1, including for example, "means for controlling an operating frequency of the microprocessor in response to the temperature". Examiner disagrees, see reasons for rejection above. Applicant has not provided any specific argument attempting to distinguish the claimed invention over the cited references, therefore, there is nothing further for the Examiner to rebut.

Applicant argues the cited references fail to teach the subject matter of claim 30, including for example, "means for controlling a voltage provided to the integrated circuit in response to the temperature". Examiner disagrees, see reasons for rejection above. Applicant has not provided any specific argument attempting to distinguish the claimed invention over the cited references, therefore, there is nothing further for the Examiner to rebut.

Applicant argues the cited references fail to teach the subject matter of claim 36, including for example, "a controller coupled to the integrated circuit to control a voltage provided to the integrated circuit in response to the temperature". Examiner disagrees, see reasons for rejection above. Applicant has not provided any specific argument attempting to distinguish the claimed invention over the cited references, therefore, there is nothing further for the Examiner to rebut.

Applicant argues the cited references fail to teach the subject matter of claim 40, including for example, "a controller coupled to the microprocessor to control an operating frequency of the microprocessor in response to the temperature". Examiner disagrees, see reasons for rejection above. Applicant has not provided any specific argument attempting to distinguish the claimed invention over the cited references, therefore, there is nothing further for the Examiner to rebut.

Applicant argues the Examiner has refused to give patentable weight to at least one clause in each independent claim. In claim 1, Applicant argues the function of the means is to control a frequency in response to a temperature. In claim 30, Applicant argues the function of the means is to control a voltage in response to a temperature. In claims 7 and 8, Applicant argues "in response to the temperature sensed by the temperature sensor" should be given patentable weight.

As noted by Applicants, 35 USC 112, sixth paragraph has been invoked. A claim limitation will be interpreted to invoke 35 USC § 112, sixth paragraph, if it meets the following 3-prong analysis: (A) the claim limitations must use the phrase "means for" or "step for;" (B) the "means for" or "step for" must be modified by functional language; and (C) the phrase "means for" or "step for" must not be modified by sufficient structure, material or acts for achieving the specified function. See MPEP § 2181 .1. In claim 1, the limitation "in response to the temperature" will not be given patentable weight because it is an act that modifies the means for achieving the specified function. Any means for controlling an operating frequency of the microprocessor will read upon the means-plus-function limitation. In claim 7, the limitation "in response to the temperature

Art Unit: 1795

sensed by the temperature sensor” will not be given patentable weight because the phrase is an act and structure (sensor) that modifies the means. Any means for modifying a fluid flow will read upon the means-plus function limitation. In claim 8, the limitation “in response to the temperature sensed by the temperature sensor” will not be given patentable weight because the phrase is an act and structure (sensor) that modifies the means. Any means for modifying a power output level of the fuel cell will read upon the means-plus function limitation. In claim 30, the limitation “in response to the temperature” will not be given patentable weight because it is an act that modifies the claimed means. Any means for controlling a voltage provided to the integrated circuit will read upon the means-plus-function limitation.

Regarding claims 36 and 40, Applicant argues the examiner has refused to give patentable weight to “coupled to control a voltage to the integrated circuit in response to the temperature” and “coupled to control an operating frequency of the microprocessor in response to the temperature”. Applicant asserts the limitations are structural and should be given patentable weight. Claim 36 recites “a controller coupled to an integrated circuit”, which is given patentable weight because it imparts structure to the claimed apparatus. However, “to control a voltage provided to the integrated circuit in response to the temperature” is not given patentable weight in apparatus claim 36. Claim 40 recites “a controller coupled to the microprocessor”, which is given patentable weight because it imparts structure to the claimed apparatus. However, “to control an operating frequency of the microprocessor in response to the temperature” is not given patentable weight in apparatus claim 40. Parr teaches a fuel cell system apparatus

Art Unit: 1795

wherein a controller in the fuel cell system performs various operating parameter checks at a predefined schedule, including one or more of a stack temperature check, a stack current check, a stack voltage check and/or a cell voltage check.

Applicant asserts the examiner is treating the limitations as structural when considering the means-plus function claims. It is unclear how Applicant reaches this conclusion. The phrase "means for" must not be modified by sufficient structure. Applicant further asserts the examiner is treating the limitations as functional when considering the non means plus function claims. It is unclear how Applicant reaches this conclusion. Limitations regarding the operating or functioning of a claimed apparatus are not given patentable weight. The apparatus need only be structurally capable of performing the operation or function.

Examiner notes that Applicant has not provided any specific arguments regarding the obvious rejection of record.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1795

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday & Tuesday (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/TRACY DOVE/
Primary Examiner, Art Unit 1795
January 7, 2010